

A new species of leaf insect (Phasmida: Phylliidae) from West Papua, Indonesia

PAUL D. BROCK

The Natural History Museum, Cromwell Road, South Kensington, SW7 5BD, London, United Kingdom; pauldbrock@btinternet.com

Abstract: A new leaf insect species *Phyllium* (*Phyllium*) *telnovi* is described based on a single male specimen from the Tamarau Mountains, West Papua, Indonesia. An overview is also provided on leaf insect (Phylliidae) taxonomy.

Key words: Phasmida, Phasmatodea, *Phyllium telnovi* sp. nov., taxonomy.

Introduction

Leaf insects have always fascinated entomologists but have only been moderately well studied since 2000. This paper discusses a leaf insect found on a 2012 zoological expedition by the Entomological Society of Latvia to Indonesia (West Papua) (Plates 2-3) which has been found to be new to science, namely *Phyllium* (*Phyllium*) *telnovi* sp. nov. Including this new species, there are now fifty-two species of leaf insects (Phylliidae) in four genera (Brock 2013) from Australasia and South-East Asia. This is a substantial increase from the thirty-seven described species referred to only ten years ago (Brock, Hasenpusch 2003), reflecting recent work by several amateur phasmid specialists; there are also still undescribed taxa in some museum collections visited by the author. The Phylliidae is one of the smallest phasmid families, with just 1.7% of described phasmids (Brock 2013) but apart from introduced specimens i.e. as curiosities from sailors, they are limited to parts of two continents and are rather restricted in movement, as females cannot fly. Leaf insects are seldom recorded not only because of their camouflage, but it is likely that some species reside in the canopy of trees, hence sometimes only males are known, which are good fliers and are occasionally attracted to lights.

Recent research on Phylliidae

There have been the following recent notable papers and books on leaf insects, prior to this the only detailed publication in the last century was Klante (1976):

Brock & Hasenpusch (2003): A revision of Australian species, clarifying confusion in the literature regarding the identity of species.

Grösser (2001, 2008): A popular book [in German] on Phylliidae, with much effort made to illustrate adults and eggs.

Zompro & Grösser (2003): A generic revision.

Hennemann et al. (2009): A revision of species from the Philippines and reclassification, including clarification of several identifications.

Material and Methods

The holotype is deposited in the Natural History Museum, London collection. It has been compared with all Phylliidae, either by examination of type material (including reference to type photographs in Brock 2013) or literature.

In view of detailed revisions (see recent research above) no keys are provided in this paper.

Acronyms used in the text:

BMNH – The Natural History Museum, London, United Kingdom.

Description

Phylliidae Illiger, 1798

Phyllium (*Phyllium*) Illiger, 1798

Type species: *Gryllus siccifolius* Linnaeus, 1758 (= *Phyllium siccifolium*), by original monotypy.



For full details, see Brock (2013), for diagnosis and keys, Hennemann et al. (2009).

***Phyllium (Phyllium) telnovi* sp. nov.** (Plates 2-3)

Holotype ♂ BMNH(E)#845382, INDONESIA E, West Papua, Tamarau Mts, Fef vill. ~ 11 km W, 00° 46' 12"S, 132° 19' 56"E, ~800 m, 13.II.2012, primeval lowland rainforest, MV light, leg. D.Telnov.

Derivatio nominis: Named after the collector, the well-known coleopterist Dmitry Telnov (Latvia). Measurements: Holotype ♂: Body length 50 mm, head 3.1 (width 2.9 mm), antennae 32 mm, pronotum 2.9, mesonotum 3, metanotum 3 (+ median segment 2 mm), forewing 16 mm, hindwing 40 mm, femora: fore 10 mm, mid 10 mm, hind 10 mm; tibiae: fore 6 mm, mid 6 mm, hind 7 mm. Cerci 2 mm.

Description of male: Yellowish green insect (green when alive, with brown patches on fore legs and mid femora) Distinguished from other *Phyllium* species by the conspicuous shape of the abdomen; fore tibiae also with larger teeth on the interior lobe than in other related species in the *P. siccifolium* group. Head: Marginally longer than broad, eyes large and dark brown. Three ocelli present. Antennae with 23 segments, basal segment flattened and broadened, segment 2 short. Segments 3-19 much gradually increasing in length, with long black hairs (longer than width of segment). Segments 20-23 are shorter than previous segments, with short hairs. Thorax: Pronotum a little shorter than head and slenderer, with bold central line and median depression. Mesonotum and metanotum smooth, about the same length as pronotum, but mesonotum broadened towards hind part, as is typical in male leaf insects. Upper ridge of mesonotum with 5 well spaced teeth laterally, decreasing in size towards posterior. There are 7 well spaced teeth laterally on lower ridge, with smaller teeth beneath. Metanotum broadening to abdomen. Abdomen: Distinctly shaped, segment 3 with a slightly curved base, very broadened rounded 4th segment, tapering sharply to segment 6, then narrowed significantly in segment 7, still tapering to anal segment, which is rounded at tip. Cerci fairly stout, leaf-like. Vomer tapered to a pointed tip. Wings: Forewings elongate, leaf-like, exceeding end of second abdominal segment. Hindwings long, translucent; reaching beyond end of 9th abdominal segment. Subgenital plate broad, tip rounded. Legs: Characteristic of the genus, with large triangular lobes interior and exteriorly. Interior lobes of fore femora with five spines anteriorly (resulting in unusually large 'u' shaped gaps), the

central spine being very short. The lobe is more than half length of the fore femur The mid and hind femora have minute spines anteriorly; almost half of mid femur brown posteriorly, with brownish banding near teeth of fore femur and on lobe of fore tibia. The fore tibiae lack an exterior lobe.

Sexual dimorphism: Female not known, but from the author's evaluation of other taxa, is expected to have a very rounded abdomen.

Diagnosis: Closely related to *Phyllium (Phyllium) siccifolium* (Linnaeus, 1758) and placed in the *Phyllium siccifolium* group [the distribution range of *P. siccifolium* is Moluccas: Halmahera, Ambon, Seram, Sula Islands, Banggai Island and Buru (Hennemann et al. 2009), although further research may be needed on the distribution range as this involves Indonesian islands separated by deep water straights. Grösser (2011)] has already disputed the arrangement (see 'Discussion' section). *P. telnovi* differs from *P. siccifolium* by the considerably more broadened abdomen and distinct 'u' shaped gaps on interior lobes of fore femora. It is interesting that out of 28 described *Phyllium (Phyllium)* species, only three other species are recorded from 'New Guinea', i.e. *P. caudatum* Redtenbacher, 1906 (New Britain, Papua New Guinea, Solomon Islands), *P. elegans* Grösser, 1991 (North New Guinea) and *P. zomproi* Grösser, 2001 (Aseki, Morobe Province, Papua New Guinea), whereas six of the 12 *Phyllium (Pulchriphyllium)* species are from 'New Guinea' (mostly Papua New Guinea), with some other species found in nearby islands.

Ecology: This species was collected in lowland primary rainforest at mercury-vapour light.

Distribution: so far only known from the type locality, the Tamarau Mountains, West Papua, Indonesia.

Discussion

There is disagreement over taxonomy of certain *Phyllium* species, with a history of misidentifications, repeated descriptions of the same species and general confusion (there are 52 species of Phyllidae, many described from a single specimen, yet there are another 21 invalid species names (Brock 2013)). For example, *Phyllium (Phyllium) tobeloense* Grösser, 2007 was regarded as a synonym of *Phyllium (Phyllium) siccifolium* by Hennemann et al. (2009) but returned to valid species status by Grösser, 2011, although doubts still remain over the correct placement, with a convincing discussion by Hennemann et al. (2009).



For the time being the species are separated in the online Phasmida Species File (Brock 2013), although this only reflects the most recent taxonomic change, pending further evaluation by specialists. There has been considerable confusion even by a basic distinguishing feature to place species in subgenera of *Phyllium* i.e. the presence (subgenus *Pulchriphyllium*) or absence (subgenus *Phyllium*) of exterior lobes on the fore tibiae, as clarified by Grösser (2008: 85) [assuming subgenera are even warranted]. Molecular phylogenetics such as DNA Barcoding would be useful in order to help solve such disputes, particularly with isolated island populations. However, the difficulty in obtaining even specimens of both sexes means this is unlikely, but a mindset change is also needed by phasmid enthusiasts to consider the potential benefits of molecular work alongside other taxonomic methodology. It is considered that DNA barcoding would work well with leaf insects, particularly isolated island populations and it is hoped that a scientist will take up the challenge in future, including providing maps of taxa (of little relevance at present, particularly with some species just known from 'New Guinea'). At present the range is unlikely to be accurate due to lack of material and misinterpretation of forms. However, from morphological studies it is believed the new species described from the Tamarau Mountains (an understudied location some considerable distance from other related species), differs significantly from species known from only one sex (frequent in Phylliidae) and adds to our limited knowledge of the Phylliidae from this vast region. The answer to other questions, such as are subgenera necessary and is the extensive range of some taxa correct, may be subject to debate by phasmid specialists for some time.

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Numerous other references for Phylliidae are available from Brock (2013).

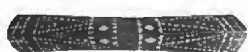


Plate 2

BROCK, P.D.: A new species of leaf insect (Phasmida: Phylliidae) from West Papua, Indonesia



Figure 1. Tamarau Mountains, West Papua, Indonesia at sampling site of the holotype *Phyllium* (*Phyllium*) *telnovi* sp. nov. (photo: D. Telnov).



Figure 2. *Phyllium* (*Phyllium*) *telnovi* sp. nov., holotype male: dorsal view.

Plate 3

BROCK, P.D.: A new species of leaf insect (Phasmida: Phylliidae) from West Papua, Indonesia



1



2



3

Figures 1-3. *Phyllium (Phyllium) telnovi* sp. nov., holotype male. 1 - Right fore leg; 2 - End of abdomen, dorsal view; 3 - End of abdomen, ventral view.



Figure 4. *Phyllium (Phyllium) telnovi* sp. nov., holotype male: head and thorax, dorsal view.